## Climate Change and Human Health Literature Portal



# Climate impacts on European agriculture and water management in the context of adaptation and mitigation--The importance of an integrated approach

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#### Abstract:

We review and qualitatively assess the importance of interactions and feedbacks in assessing climate change impacts on water and agriculture in Europe. We focus particularly on the impact of future hydrological changes on agricultural greenhouse gas (GHG) mitigation and adaptation options. Future projected trends in European agriculture include northward movement of crop suitability zones and increasing crop productivity in Northern Europe, but declining productivity and suitability in Southern Europe. This may be accompanied by a widening of water resource differences between the North and South, and an increase in extreme rainfall events and droughts. Changes in future hydrology and water management practices will influence agricultural adaptation measures and alter the effectiveness of agricultural mitigation strategies. These interactions are often highly complex and influenced by a number of factors which are themselves influenced by climate. Mainly positive impacts may be anticipated for Northern Europe, where agricultural adaptation may be shaped by reduced vulnerability of production, increased water supply and reduced water demand. However, increasing flood hazards may present challenges for agriculture, and summer irrigation shortages may result from earlier spring runoff peaks in some regions. Conversely, the need for effective adaptation will be greatest in Southern Europe as a result of increased production vulnerability, reduced water supply and increased demands for irrigation. Increasing flood and drought risks will further contribute to the need for robust management practices. The impacts of future hydrological changes on agricultural mitigation in Europe will depend on the balance between changes in productivity and rates of decomposition and GHG emission, both of which depend on climatic, land and management factors. Small increases in European soil organic carbon (SOC) stocks per unit land area are anticipated considering changes in climate, management and land use, although an overall reduction in the total stock may result from a smaller agricultural land area. Adaptation in the water sector could potentially provide additional benefits to agricultural production such as reduced flood risk and increased drought resilience. The two main sources of uncertainty in climate impacts on European agriculture and water management are projections of future climate and their resulting impacts on water and agriculture. Since changes in climate, agricultural ecosystems and hydrometeorology depend on complex interactions between the atmosphere, biosphere and hydrological cycle there is a need for more integrated approaches to climate impacts assessments. Methods for assessing options which "moderate" the impact of agriculture in the wider sense will also need to consider cross-sectoral impacts and socio-economic aspects.

**Source:** http://dx.doi.org/10.1016/j.scitotenv.2009.05.002

**Resource Description** 

## Climate Change and Human Health Literature Portal

Communication: M

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: M

audience to whom the resource is directed

Policymaker

**Exposure:** 

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Food/Water Security, Food/Water Security

**Extreme Weather Event:** Drought, Flooding

Food/Water Security: Agricultural Productivity

Geographic Feature: M

resource focuses on specific type of geography

None or Unspecified

Geographic Location: M

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact: M

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Population of Concern: A focus of content

Population of Concern: M

populations at particular risk or vulnerability to climate change impacts

Elderly, Low Socioeconomic Status, Workers

Resource Type: M

format or standard characteristic of resource

Review

# Climate Change and Human Health Literature Portal

## Resilience: M

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

### Timescale: **™**

time period studied

Time Scale Unspecified

# Vulnerability/Impact Assessment: ₩

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content